

U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Sonorella rosemontensis*

COMMON NAME: Rosemont talussnail

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: June 2010

STATUS/ACTION

☐ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

☒ New candidate

☐ Continuing candidate

☒ Non-petitioned

☐ Petitioned - Date petition received:

☐ 90-day positive - FR date:

☐ 12-month warranted but precluded - FR date:

☐ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)?

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions?

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

☐ Listing priority change

Former LP:

New LP:

Date when the species first became a Candidate (as currently defined):

☐ Candidate removal: Former LPN:

☐ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

☐ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

☐ F – Range is no longer a U.S. territory.

☐ I – Insufficient information exists on biological vulnerability and threats to support

listing.

- ___ M – Taxon mistakenly included in past notice of review.
- ___ N – Taxon does not meet the Act’s definition of “species.”
- ___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Snails: Gastropoda, Pulmonata,
Helminthoglyptidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Arizona, Pima
County

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:
Arizona, Pima County

LAND OWNERSHIP: Private (patented mining claims)

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BIOLOGICAL INFORMATION:

Species Description

The Rosemont talussnail (*Sonorella rosemontensis*, Pilsbry 1939) is a terrestrial snail with shell height of 12.7 millimeters (mm) (0.5 inches (in)), diameter of 21.7 mm (0.85 in), and about 4.5 whorls. The shell is polished, moderately solid, pale brown, fading around the umbilicus (belly button), with a light-bordered chestnut brown band.

Taxonomy

The Rosemont talussnail is a member of the family Helminthoglyptidae (Phylum Mollusca; Class Gastropoda, Subclass Pulmonata). It was first described by Pilsbry (1939, pp. 348-349) from specimens collected from the type locality in the Santa Rita Mountains, Pima County, Arizona. It was previously considered to be identical to *Sonorella hesterna* (Pilsbry 1939, p. 349; Pilsbry and Ferris 1923, p. 90). Bartsch (1940, p. 293) concluded that Pilsbry (1939) had displayed good judgment in his definition of this species. It is worth noting that in an unpublished report, Miller (1978) speculated that *S. rosemontensis* may be a subspecies or synonym of *S. walkeri*. However, Bequaert and Miller (1973, p. 115) and Turgeon *et al.* (1988, p. 146) validated the species description by Pilsbry (1939) in their respective reviews of mollusks, both peer-reviewed published pieces of literature. Furthermore, the taxon is recognized by the Integrated Taxonomic Information System (2010, pp. 1-2). Accordingly, we have carefully reviewed the available taxonomic information to reach the conclusion that *Sonorella rosemontensis* is a valid taxon.

Distinguishing talussnail species from one another by casually examining shells in the field is

difficult, if not impossible, and positive identification requires examination of mature reproductive organs by technical experts (Fairbanks and Reeder 1980, p. 397; Hoffman 1990, p. 4; Hoffman 1995, p. 2; Weaver and Guralnick 2009, p. 5). Non-experts may confuse talussnail species with other members of the genus *Sonorella*, or even with closely related genera including *Eremarionta*, *Mohavelix*, or *Helminthoglypta*, some of which occur in the Santa Rita Mountains.

Historical Range/Distribution

The available literature indicates the species was known from the type locality at the northern end of the Santa Rita Mountains (Station 49) near Rosemont, west saddle of Santa Rita Mountains, overlooking Helvetia, and from the surrounding area (Pilsbry and Ferris 1923, p. 90; Pilsbry 1939, p. 349; Bequart and Miller 1973, p. 115). In an unpublished thesis, Miller (1967, p. 69-71) reported the Rosemont talussnail in a rockslide about 1.5 miles (mi) (2.41 kilometers (km)) southeast of Helvetia and confirmed that the species is known only from the northern end of the Santa Rita Mountains. Miller's field notes described the location as Section 25, T18S, R15E, west of center at about 1,676 meters (m) (5,500 feet (ft)) (Miller 1965, p. 1). In an unpublished report, Miller (1978, pp. 113-114) reported the Rosemont talussnail from northwest-facing rockslides, in Sections 24 and 25, T18S, R15E.

Current Range/Distribution

To our knowledge the current range of the species has not changed from the historical range. However, some confusion exists regarding the exact location of the type locality (Martinez 2008, p. 1; Sorensen 2009, p. 3; Schmalzel 2009, p. 1; Arizona Game and Fish Department (AGFD) 2009, p.1; WestLand 2010, p. 61), and we believe this issue warrants discussion.

Pilsbry and Ferriss (1918, p. 294) first described *Sonorella hesterna* from a long series of shells taken in a rock slide on the southern foothills of the Rincon Mountains, which they referred to as Station 148 (1917). Pilsbry and Ferriss (1923, p. 90) expanded the range of *S. hesterna* to the northern end of the Santa Rita Mountains, Station 49 near Rosemont. Pilsbry (1939, p. 348) then assigned the snails in the north at Station 49 to the Rosemont talussnail, with the same location information provided in Pilsbry and Ferriss (1923). Bequaert and Miller (1973, p. 115) confirmed the location of the species in the Santa Rita Mountains, northern end at Station 49, near Rosemont. Unfortunately, none of these publications provided a map or a detailed description of the specific location of Station 49.

The best description of the location of Station 49 is contained in the field notes compiled by Ferriss (1917, p. 2). Those notes state that Station 49 is in a saddle above Station 48, east side; and Station 48 is in slides near tunnels south of the camp. The important clue here is the referenced camp. The Narragansett Mine was operational in the Rosemont area in 1917, the time period that Ferriss would have sampled the area for snails; and the mining camp associated with the mine was referred to as New Rosemont (Ayres 1984, p. 134). Ayres (1984, p. 132) describes the site of New Rosemont as extending over an area from McCleary Canyon Wash, west about 396 m (1300 ft) along the line between Sections 19 and 30, T18S, R16E. He further states that most of the site was situated on an east-west trending ridge designated as "grassland" in McLaughlin and Van Asdall (1977, p. 72).

This information seems to place the camp in the NW ¼ of Section 30, T18S, R16E. Ferriss (1972, p. 2) places Station 48 south of the camp. Various saddles occur above this area along a ridgeline running from the SE ¼ of Section 24, T18S, R16E, to the NW ¼ of Section 25, T18S, R16E, including saddles near Gunsight Pass, Hart's Butte, Weigle's Butte, and Coconino Saddle. Recent reviews speculate the location of the type locality as either Weigle's Butte, Gunsight Pass, or Coconino Saddle (WestLand 2009, p. 7; Martinez 2009, p. 1; Sorensen 2009, p. 4; Schmalzel 2009, p. 1; WestLand 2010, p. 61). However, based on the description of the camp by Ayres (1984, p. 132) and the placement of Station 48 by Ferriss (1972, p. 2) south of the camp, we believe Weigle's Butte best fits the description of the type locality for the Rosemont talussnail (Station 49).

Interestingly, the locality description by Ferriss (1972, p. 2) does not fit well with areas described by Miller (1965, p. 1; 1967, p. 69-71; 1978, p. 113-114), leading us to conclude that Miller did not sample the type locality during his studies. Specifically, Ferriss (1972, p. 2) describes Station 49 from the "Ea side" while Miller (1965, p. 1; 1978, p. 113-114) describes the Rosemont talussnail from the "W side" of the mountains. Accordingly, we find the best available information indicates that Rosemont talussnail occurs at least three separate sites. Two sites are described by Miller (1965, p. 1; 1967, pp. 69-71; 1978, p. 113-114), while the third is described by Pilsbry (1939, pp. 348-349). These sites are depicted in Figure 1.

Habitat/Life History

The Rosemont talussnail occurs in talus at elevations of about 5,500 ft (1676 m) (Pilsbry 1939, p. 349, Bequaert and Miller 1973, p. 115, AGFD 2008, p. 2). The biotic community in the Rosemont area of the Santa Rita Mountains can generally be characterized as semi-desert grassland (Brown 1994, pp. 123- 131).

The distribution and diversity of talussnails across the arid southwest are largely products of significant dispersal and geographic separation that occurred during the numerous climatic changes of the Pleistocene era (Bequaert and Miller 1973, p. 22; McCord 1995, p. 321). These conditions led to profuse speciation and substantial endemism among *Sonorella*. The Santa Rita and Patagonia Mountains together contain four endemic (organisms with narrowly distributed isolated populations) talussnails (Bequaert and Miller 1973, p. 24). Importantly, the conditions of the present-day arid southwest render dispersal into new territories by *Sonorella* improbable (Bequaert and Miller 1973, p. 22). WestLand (2009, p. 3) also found *Sonorella* species in 26 localities in the Santa Rita Mountains along slopes, ridge lines, and canyon bottoms.

Sonorella is generally considered a rock snail, occupying rockslides and talus slopes (slopes composed of volcanic rock and limestone) (Pilsbry 1939, p. 268, Naranjo-Garcia 1988, p. 84, Pearce and Orstan 2006, p. 265). Most species prefer steep rock slides with sufficient interstitial space (space between rocks) that allow crawling to the proper depth for protection from summer heat (Bequaert and Miller 1973, p. 27; Hoffman 1990, p. 7; Hoffman 1995, p. 5). Occupied sites can usually be identified by the presence of dead and bleached shells, which are typically abundant because they disintegrate slowly in arid environs (Pilsbry 1939, p. 269). Talussnails are sometimes found in other mesic (moderately wet) habitats, such as canyon bottoms.

Talusnails spend a lot of time in estivation (dormancy), perhaps up to three years at a time (Hoffman 1990, p. 7). To prepare for estivation, talusnails use mucus and calcium to attach the opening of the shell to the face of a rock to make a waterproof seal. During estivation, talusnails survive by extracting calcium carbonate from their shells, which is redeposited when active feeding resumes (Hoffman 1990, p. 7). Weather conditions are the most important factor affecting activity of living *Sonorella*, with talusnails only active above ground during or following summer monsoon rains (Jontz *et al.* 2002a, p. 3; Weaver and Guralnick 2009, p. 3). Talusnails feed primarily on fungus and decaying plant matter (Hoffman 1990, p. 7; Hoffman 1995, p. 6; AGFD 2008, p. 2). *Sonorella* species in the Santa Rita Mountains have been reported foraging on *Xanthoparmelia*, a foliose lichen, during and after rains (WestLand 2009, p. 4).

Pulmonate snails (snails with functional lungs), like the Rosemont talusnail, are hermaphroditic, meaning an individual snail has both male and female sex organs (Pearce and Orstan 2006, p. 263). *Sonorella* species mate face-to-face and insemination is simultaneous reciprocal, meaning when two talusnails meet both are usually inseminated (Hoffman 1995, p. 6; Davison and Mordan 2007, p. 175). During or after rain events, talusnails lay a clutch of thirty to forty eggs once or twice during summer. Fluctuations in humidity may cause large variations in rates of maturation and life span of talusnails. The life span of land snails is dependent on their cycle of activity, though talusnails are believed to live 8 to 9 years (Hoffman 1995, p. 6).

Talusnails are believed to be eaten by rodents and birds, but this is probably a sporadic random occurrence (Hoffman 1990, p. 10). Many mountain ranges in southeastern Arizona are inhabited by a snail-eating beetle (*Scaphinotus*) which presumably preys upon talusnails (McCord 1995, p. 321). Desert box turtles (*Terrapene ornate luteola*) have been found to be a predator of *Sonorella pedregosensis*, a talusnail from southeastern Arizona (Gilbertson and Radke 2006, p. 17).

Population Estimates/Status

No specific information on population size or stability is available for the Rosemont talusnail. We are unaware of any information regarding population size estimates for any *Sonorella* species, and such information would be difficult to acquire considering the life history of the genus.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range. The primary threat to Rosemont talusnail is mining. All localities described by the available literature are located on patented mining claims or Rosemont private lands, as depicted in the Rosemont Project Claim Boundary Map (WestLand 2007, p. 1-2) and the Rosemont Facility Plan Ultimate Configuration (WestLand 2007, p. 1-3). The surface resources and mineral rights associated with patented mining claims have passed from Federal ownership to private ownership (Everson 2009, p. 1). The entire range of the species is located on lands designated for the purpose of hard rock mining, which typically involves the blasting of hillsides and the crushing of rock. Such activities would kill talusnails and render their habitats unsuitable.

Additionally, the proposed construction and operation of the Rosemont Copper Mine may result in immediate destruction of occupied habitat. Talus slopes near Weigle's Butte lie at least partially within the footprint of the proposed open pit of the copper mine. The Rosemont Copper Project is a proposed 1,786 hectare (ha) (4,415 acre (ac)) open-pit copper mine, storage area for waste rock and tailings, and plant facilities. Even though the Rosemont talussnail occurs on private lands, the proposed project will take place in an area of mixed land ownership; 995 ac (403 ha) of private land, 3,330 ac (1348 ha) of lands administered by the Coronado National Forest, 15 ac (6 ha) of Bureau of Land Management lands, and 75 ac (30 ha) of lands administered by the Arizona State Land Department. Project planning is well underway and the compliance timeline anticipates a Final Environmental Impact Statement and Record of Decision by July-September 2010, and a Record of Decision (ROD) by October-December 2010 (U.S. Forest Service (USFS) and Rosemont Copper Company 2009, p. 2). Once the ROD is issued, the full scale project could commence, possibly as soon as late winter or early spring of 2011. In fact, land clearing has already begun on Rosemont Mine property for the purpose of a research project that may eventually contribute to Rosemont's reclamation efforts (Davis 2009, p. 1). However, the Forest Service (2010, p. 1) recently announced a revised schedule indicating that the Draft Environmental Impact Statement will be released during the fourth quarter of this year.

Construction and operation of the open pit would entail blasting rock with ammonium nitrate and fuel oil in dry ground, and ammonium nitrate emulsions in wet conditions (WestLand 2007, p. 12). After blasting, ore laden rock will be transported via haul trucks to a crusher and then a grinder to produce finely ground ore (WestLand 2007, p. 18). Ground ore will then be taken to a flotation plant where it will be processed to extract copper concentrate (WestLand 2007, p. 19-20). Waste rock and tailings will then be placed in storage areas primarily on public lands, including parts of McCleary Canyon where *Sonorella* species of unknown taxonomy occur (WestLand 2007, p. 23).

Any talussnails within the footprint of the pit would be expected to be killed during the ore extraction process (i.e., blasting and crushing). Any talus rock blasted and transported to the crusher would no longer exist as suitable habitat for the Rosemont talussnail. However, there is some uncertainty whether or not occupied habitat occurs within the proposed mine footprint. If the talus slope near Weigle's Butte is a currently occupied site, which we believe it is, then one of the known three localities where the species is found could be destroyed by the construction of the Rosemont Copper Mine. Furthermore, talus slopes or portions of talus slopes immediately adjacent to the pit could be rendered unsuitable for talussnail occupation. Steep hillsides may be difficult to stabilize and upslope habitats outside the footprint may destabilize because of induced erosion. The area immediately surrounding the open pit will likely require a perimeter road. Sedimentation and filling of interstitial spaces of talus slopes due to road building, vehicle traffic, excavation, and dirt/rock moving are likely to increase with runoff from rain and snow melt. This may affect talus slopes immediately outside the footprint of the mine, depending on runoff. Filling of interstitial spaces has been identified as a threat to other *Sonorella* species because increased interstitial sedimentation can alter the moisture conditions in the talus slope (Jontz *et al.* 2002b, p. 1). Additionally, talussnails and their food base can be threatened by windblown pollutants, such as airborne contaminants from mining, waste rock, and tailings piles that contain heavy metals (Center for Biodiversity 2010, p. 9).

Attempting to mitigate the loss of natural talussnail habitat by creating manmade talus slopes would be difficult as the precise necessary habitat conditions are unknown. Regardless, even if habitat conditions were known, we are not aware of attempts to create talussnail habitat, and we anticipate that such endeavors would be experimental with uncertain success.

Accordingly, we find that the Rosemont talussnail is in danger of extinction throughout its entire range in the foreseeable future by the reasonably anticipated impacts from mining activities on patented mining claims, potentially including the impending Rosemont Copper Mine.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

The Rosemont talussnail has been subject of a number of scientific studies aimed at determining taxonomy and distribution. Center for Biological Diversity (2010, p. 19) reports that Westland Resources collected over 100 live talus snails from the Rosemont area during surveys in 2008 and 2009. However, we have no information indicating that they have had discernible effects on the species' populations.

Unauthorized collecting has been identified as a threat to other snail species (65 FR 10033, February 25, 2000; 58 FR 5938, January 25, 1993; 56 FR 49646, September 30, 1991) due to their rarity, restricted distribution, and generally well-known locations. However, available information does not clearly indicate that collection is a significant threat to the Rosemont talussnail.

We conclude that overutilization for commercial, recreational, scientific, or educational purposes is not currently a threat to the Rosemont talussnail.

C. Disease or predation.

Talussnails can be eaten by rodents, birds, *Scaphinotus* beetles, and desert box turtles. However, we have no specific information regarding these particular predators in the Santa Rita Mountains, nor on predation in general as a significant threat to Rosemont talussnail.

Based on the available information, we find that disease or predation is not a known threat to the Rosemont talussnail.

D. The inadequacy of existing regulatory mechanisms.

Arizona Game and Fish Commission Order 42 (AGFD 2009b) has established no open season (no collecting) for the San Xavier talussnail (*Sonorella eremita*) and the Wet Canyon talussnail (*S. macrophallus*), two closely related congeners, but not the Rosemont talussnail. Order 42 prohibits direct taking of individual snails, but does not prohibit habitat modification.

The Rosemont talussnail is identified as a priority species in the draft 2010 State Wildlife Action Plan prepared by the AGFD. This plan helps guide the AGFD, and other agencies, in determining which biotic resources should receive priority management consideration; however, it is not a regulatory document.

The Tohono O'odam Nation recently issued a resolution opposing the Rosemont Copper Mine, making specific reference to "an unique species of talussnail, the Rosemont talussnail, likely to be severely impacted, if not completely eliminated..."

We not aware of any Federal regulations that currently specifically protect or otherwise affect the Rosemont talussnail or its habitats.

E. Other natural or manmade factors affecting its continued existence.

Climate Change: Seagar *et al.* (2007, pp. 1181-1184) analyzed 19 computer models of different variables to estimate the future climatology of the southwestern United States and northern Mexico in response to predictions of changing climatic patterns. All but 1 of the 19 models predicted a drying trend within the southwest; one predicted a trend toward a wetter climate (Seagar *et al.* 2007, p. 1181). A total of 49 projections were created using the 19 models and all but 3 predicted a shift to increasing aridity (dryness) in the Southwest as early as 2021-2040 (Seager *et al.* 2007, p. 1181).

The Rosemont talussnail depends on summer rainfall events for survival. Potential drought associated with changing climatic patterns may adversely affect summer rainfall patterns, which could affect food availability and reproduction. Certainly this species, along with its habitat, will be affected in some manner by climate change; but the magnitude and extent of the change cannot be quantified at this time. Accordingly, we cannot determine whether the Rosemont talussnail is threatened by climate change at this time.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED: None.

SUMMARY OF THREATS:

The Rosemont talussnail is primarily threatened by reasonably anticipated mining across its entire range, including the impending construction and operation of the proposed Rosemont Copper Mine. Where mining occurs in occupied habitats, it is very likely to result in the destruction of occupied habitat for the Rosemont talussnail. Specifically, talus slopes occupied by the species could be blasted and crushed, rendering them unsuitable for occupation by the species. Therefore, we find that the Rosemont talussnail is warranted for listing throughout all its range, and, thus, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

For species that are being removed from candidate status:

___ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES: We recommend that talus slopes occupied by Rosemont talussnail be set aside as conservation areas in perpetuity.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5*
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude:

Based on the best available information, the entire range of the Rosemont talussnail occurs within patented mining claims. These lands are designated for the purposes of mining and are expected to be subject to mining activities within the foreseeable future. Furthermore, the available information seems to indicate that one of three known localities for the Rosemont talussnail may occur within the footprint of the proposed Rosemont Copper Mine, which is scheduled to begin operations in the near future. Since mining may occur across the entire range of the species within the foreseeable future, we believe threats are of a high magnitude.

Imminence:

Mining on patented mining claims and Rosemont private lands is a reasonably anticipated action that is not on-going and is, therefore, nonimminent. The Rosemont Copper Mine is scheduled to commence construction and operation in the near future, potentially as soon as next year. However, due to uncertainty regarding the exact distribution of Rosemont talussnail, we can only determine for certain that the species is threatened by its occurrence on patented mining claims and private lands. Accordingly, we find that overall threats to the Rosemont talussnail are nonimminent.

Rationale for Change in Listing Priority Number (insert if appropriate) N/A

 X Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes.

Is Emergency Listing Warranted? No. The timeline for completion of the Record of Decision by the USFS is sooner than the timeline for publication of the next Candidate Notice of Review. Although a significant portion of the range of the species could be destroyed by the time it receives candidate species designation, and well before it receives any protection under the Endangered Species Act, two other sites should still harbor viable populations.

DESCRIPTION OF MONITORING

Rosemont Copper Company has contracted an environmental consulting firm, WestLand Resources, to conduct surveys for the species, investigate taxonomic issues, and to evaluate potential effects from mining (see WestLand 2009, 2010). However, AGFD (2009, p.1) explicitly recommended that additional taxonomic analyses be conducted by independent recognized experts and not by WestLand Resources.

COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: Arizona

Indicate which State(s) did not provide any information or comments: N/A

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.



10/21/2010

Approve:

Regional Director, Fish and Wildlife Service

Date



ACTING
Director, Fish and Wildlife Service

Concur:

Date: October 22, 2010

Do not concur:

Director, Fish and Wildlife Service

Date

Director's Remarks:

Date of annual review: June 2010

Conducted by: Mike Martinez

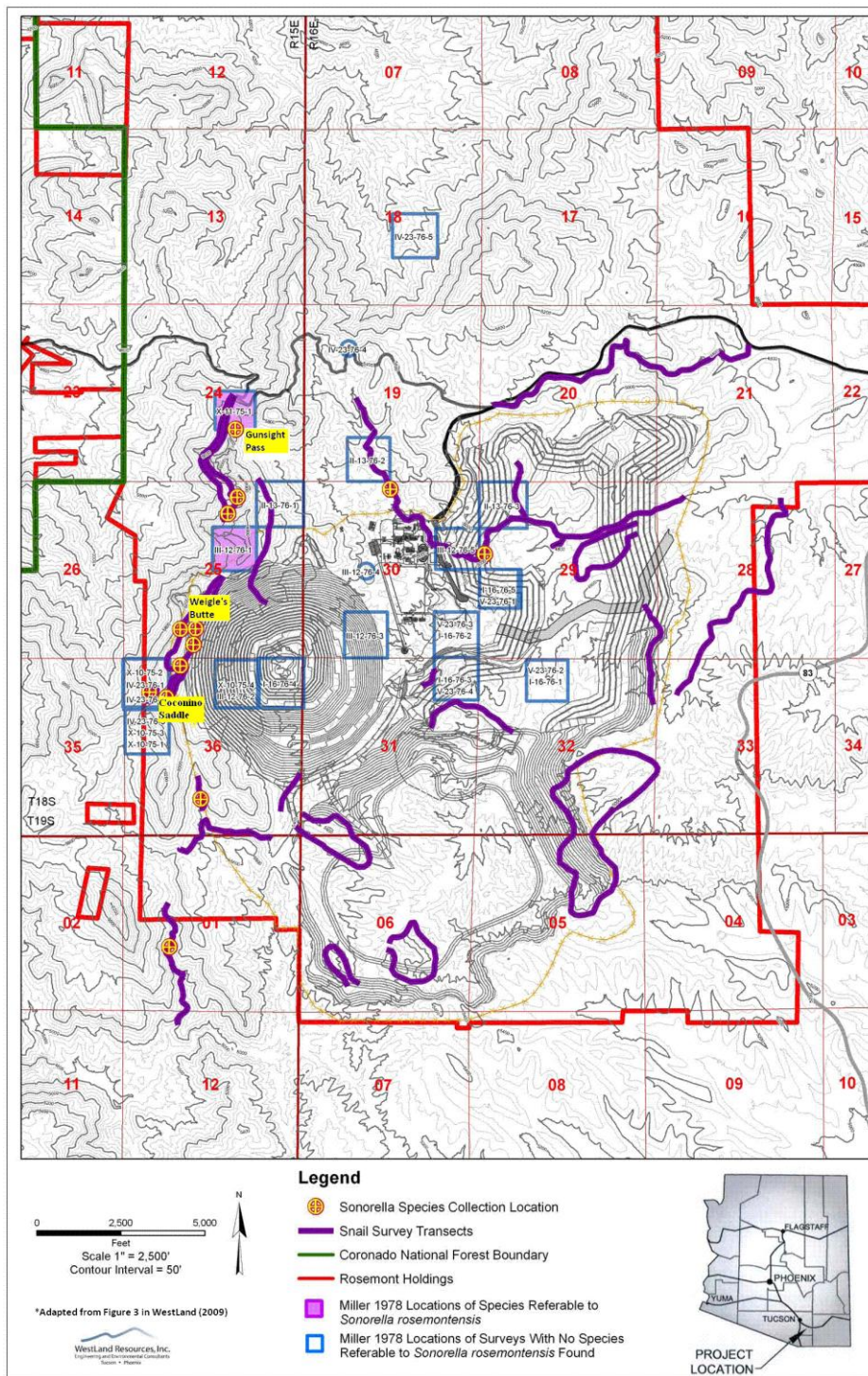


Figure 1. Rosemont talussnail distribution in relation to Rosemont Copper Mine. Occupied sites identified by Miller (1978) are depicted as purple squares. The locality described by Pilsbry (1939) is either Gunsight Pass, Weigle's Butte, or Coconino Saddle, which are depicted in yellow highlight.